

CLAIMS

1. An evaporator of the plate type having at least one inlet and at least one outlet allowing a medium to enter into and exit from said evaporator, wherein said evaporator comprises a plurality of interconnected evaporation chambers (110') disposed in parallel, having at least one common inlet and at least one common outlet allowing a medium to enter into and exit from said chambers, **characterised in** that said evaporator is equipped with an external loop (160') adapted to drain said medium from the lower parts of said evaporation chambers (110') and introduce said medium back into the evaporation chambers (110').
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2. An evaporator according to claim 1, **characterised in** that said inlet is connected to an expansion means (140') by connection means, said expansion means (140') being equipped with an additional inlet (170'), and that said external loop (160') is arranged to introduce said medium back into the evaporation chambers (110') through the additional inlet (170') of said expansion means (140').
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3. An evaporator according to claim 1, **characterised in** that said inlet is equipped with an additional inlet (170'), and that said external loop (160') is arranged to introduce said medium back into the evaporation chambers (110') through said additional inlet (170') by means of an expansion driven injector.
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4. An evaporator according to claim 1, **characterised in** that said external loop (160') comprises a pump.
5. A heat exchanger, **characterised in** that it comprises an evaporator according to any of claims 1-4.
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6. A heat exchanger of the plate type formed of interacting alternating plates having a groove pattern forming at least two separate duct loop systems allowing a first medium (I) to circulate in the first of said duct systems under heat exchange with a second medium (II) circulating in the second of said duct systems, wherein said first duct loop system comprises a part forming a plurality of interconnected evaporation chambers (450) having at least one common inlet (405) and at least one common outlet (415) allowing said first medium (I) to enter into, and exit from, said chambers (450), **characterised in** that
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- 35 said evaporation chambers (450) are equipped with an additional outlet (410) connected to drainage means (430) adapted to drain said first medium (I) from

said evaporation chambers' (450) lower parts in an external loop and introduce said first medium (I) back into said evaporation chambers (450).

7. A heat exchanger according to claim 6, **characterised in** that said interacting plates form a third duct system in which a third medium (III) can circulate under heat exchange with at least said first medium (I).

5 8. A heat exchanger according to claim 7, **characterised in** that said chambers (450) have one delimited zone (B'') defined, and, that the outlet (415) of said chambers (450) is connected, via a compressor, to a part of said first duct system forming a condenser chamber (380) having a substantially vertical channel (C'') piloting said first medium (I) from said chamber's (380) lower parts up into another delimited defined zone (A''), wherein said first medium (I) can circulate in said two delimited zones (A'', B'') under heat exchange with itself.

10 9. A heat exchanger according to claim 8, further **characterised in** that it comprises:

15 - a first duct chamber (385) having an inlet (305) and outlet (310) allowing said second medium (II) to enter said first duct chamber (385) through said inlet (305) to be piloted through said first duct chamber (385) under heat exchange with said first medium (I), and to leave said first duct chamber (385) through said outlet (310),

20 - a plurality of interconnected evaporation chambers (450) having a common inlet (405), a common outlet (415) and one delimited zone (B''), allowing said first medium (I) to enter through said inlet (405) to be piloted through said evaporation chambers (450) under heat exchange with said second medium (II) and further through said zone (B'') under heat exchange with itself, and to leave said evaporation chambers (450) through an outlet (415), and,

25 - a compressor and a condenser chamber (380) having an inlet (315) and an outlet (320), said condenser chamber (380) further having another delimited zone (A'') and a substantially vertical channel (C'') leading to said other delimited zone (A'') from said condenser chamber's (380) lower parts and said compressor being connected to said outlet (415) and said inlet (315), allowing said first medium (I) to be piloted from said outlet (415) into said condenser chamber (380) through said inlet (315) via said compressor and further piloted through said condenser chamber (380) under heat exchange with said third medium (III), and further piloted up through said channel (C'') into and through said other zone (A'') through which said first medium (I) is allowed to be piloted under heat exchange with itself and thereafter to leave

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said condenser chamber (380) through said outlet (320), and,

- an expansion valve (440) connected to said outlet (320) and inlet (405) allowing said first medium (I) to be piloted from said condenser chamber (380) into said evaporation chambers (450) through said inlet (405) via said expansion valve (440), and,
- a second duct chamber (485) having an inlet (420) and an outlet (425) allowing said third medium (III) to enter into said second duct chamber (485) through said inlet (420) and to be piloted through said duct chamber (485) under heat exchange with said first medium (I) and allowing said third medium (III) to leave said duct chamber (485) through said outlet (425).

10. A heat exchanger according to any of claims 6-9, **characterised in** that said drainage means (430) are arranged to introduce said first medium (I) back into the evaporation chambers (450) through an external expansion means (440) feeding said inlet (405) with said first medium (I).

15 11. A heat exchanger according to any of claims 6-9, **characterised in** that said drainage means are arranged to introduce said first medium (I) in an additional inlet by means of an expansion driven injector.

12. A heat exchanger according to any of claims 6-10, **characterised in** that said drainage means (430) comprise a pump.

20 13. A heat pump system, **characterised in** that it comprises an evaporator according to claims 1-4 and/or a heat exchanger according to claims 5-12.

14. An air condition system, **characterised in** that it comprises an evaporator according to claims 1-4 and/or a heat exchanger according to claims 5-12.